

IN THE CLAIMS:

Please amend Claims 1 and 13 as follows.

1. (Currently Amended) An image processing apparatus for generating information that allows detection of a position of tampering for an original image which is formed of first and second regions, the second region being a bit plane that consists of least significant bits of the original image, and the first region consisting of all bit planes forming the original image other than the bit plane corresponding to the second region, comprising:

reduction means for reducing a size of an image corresponding to the first region ~~the height and width of an image corresponding to the first region by 1/2;~~

binary image generation means for binarizing the reduced image to generate a binary image;

watermark information generation means for generating watermark information which contains the binary image and additional information;

error-correction encoding means for generating error-correction encoded watermark information by making error-correction encoding of the watermark information by using a parameter;

reconstructing means for reconstructing the error-correction encoded watermark information by varying an arrangement order of each bit which forms the error-correction encoded watermark information; and

output means for outputting, as an output image, an image formed by replacing an image corresponding to the second region with the error-correction encoded watermark information reconstructed by said reconstructing means,

wherein a reduction ratio used by said reduction means is determined in advance so that a size of the watermark information reconstructed by said reconstructing means is equal to or less than a size of the image corresponding to the second region the parameter is determined in advance so that a size of the error-correction encoded watermark information to be generated by

said error-correction encoding means is equal to or less than a size of the image corresponding to the second region.

2. (Original) The apparatus according to claim 1, further comprising:
encryption means for encrypting the watermark information generated by said watermark information generation means, and

wherein said error-correction encoding means makes error-correction encoding of the watermark information encrypted by said encryption means.

3. (Canceled)

4. (Previously Presented) The apparatus according to claim 1, further comprising:
Hash value calculation means for calculating a Hash value using the image of the first region, and

wherein said watermark information generation means further stores data of the Hash value in the watermark information, as the additional information.

5. (Previously Presented) The apparatus according to claim 1, wherein the additional information contains a bit sequence used to check if the watermark information is normally decoded.

6. (Previously Presented) The apparatus according to claim 5, wherein the bit sequence is a Hash value for a part of the watermark information that contains at least the binary image.

7-9. (Canceled)

10. (Withdrawn) An image processing apparatus for detecting a position of tampering in a tampered image which is formed of first and second regions, comprising:

error-correction decoding means for making error-correction decoding of an image based on the second region to reclaim watermark information which contains a feature image that represents a feature of the tampered image before tampering, and information associated with an image before tampering of the tampered image;

feature image generation means for generating a feature image of the tampered image using an image of the first region; and

tampered position notifying means for notifying the position of tampering in the tampered image using the feature image which is contained in the watermark information and represents the feature of the tampered image before tampering, and the feature image of the tampered image.

11. (Withdrawn) An image processing apparatus for generating information that allows to detect a position of tampering for an original image which is formed of first and second regions, comprising:

encryption means for encrypting watermark information, which is generated in advance, to generate encrypted watermark information;

error-correction encoding means for making error-correction encoding of the encrypted watermark information to generate error-correction encoded encrypted watermark information; and

output means for outputting, as an output image, an image formed by replacing image information of the second region in the original image by the error-correction encoded encrypted watermark information.

12. (Withdrawn) An image processing apparatus for detecting a position of tampering in a tampered image which is formed of first and second regions, comprising:

error-correction decoding means for making error-correction decoding of an image based on the second region to generate an error-corrected image based on the second region, so as to reclaim encrypted watermark information;

decryption means for decrypting the encrypted watermark information to reclaim watermark information;

watermark information verification means for verifying consistency of the watermark information; and

tampered position detection means for, when the watermark information meets the consistency, detecting a tampered position by comparing the image based on the second region and the error-corrected image based on the second region.

13. (Currently Amended) An image processing method for generating information that allows detection of a position of tampering for an original image which is formed of first and second regions, the second region being a bit plane that consists of least significant bits of the original image, and the first region consisting of all bit planes forming the original image other than the bit plane corresponding to the second region, comprising:

a reduction step of reducing ~~a size of an image corresponding to the first region~~ ~~the height and width of an image corresponding to the first region~~ by 1/2;

a binary image generation step of binarizing the reduced image to generate a binary image;

a watermark information generation step of generating watermark information which contains the binary image and additional information;

an error-correction encoding step of generating error-correction encoded watermark information by making error-correction encoding of the watermark information by using a parameter;

a reconstructing step of reconstructing the error-correction encoded watermark information by varying an arrangement order of each bit which forms the error-correction encoded watermark information; and

an output step of outputting, as an output image, an image formed by replacing an image corresponding to the second region with the error-correction encoded watermark information reconstructed in said reconstructing step,

~~wherein a reduction ratio used in said reduction step is determined in advance so that a size of the watermark information reconstructed in said reconstructing step is equal to or less than a size of the image corresponding to the second region~~
the parameter is determined in advance so that a size of the error-correction encoded watermark information to be generated in said error-correction encoding step is equal to or less than a size of the image corresponding to the second region.

14. (Withdrawn) An image processing method for detecting a position of tampering in a tampered image which is formed of first and second regions, comprising:

an error-correction decoding step of making error-correction decoding of an image based on the second region to reclaim watermark information which contains a feature image that represents a feature of the tampered image before tampering, and information associated with an image before tampering of the tampered image;

a feature image generation step of generating a feature image of the tampered image using an image of the first region; and

a tampered position notifying step of notifying the position of tampering in the tampered image using the feature image which is contained in the watermark information and represents the feature of the tampered image before tampering, and the feature image of the tampered image.

15. (Withdrawn) An image processing method for generating information that allows to detect a position of tampering for an original image which is formed of first and second regions, comprising:

an encryption step of encrypting watermark information, which is generated in advance, to generate encrypted watermark information;

an error-correction encoding step of making error-correction encoding of the encrypted watermark information to generate error-correction encoded encrypted watermark information; and

an output step of outputting, as an output image, an image formed by replacing image information of the second region in the original image by the error-correction encoded encrypted watermark information.

16. (Withdrawn) An image processing method for detecting a position of tampering in a tampered image which is formed of first and second regions, comprising:

an error-correction decoding step of making error-correction decoding of an image based on the second region to generate an error-corrected image based on the second region, so as to reclaim encrypted watermark information;

a decryption step of decrypting the encrypted watermark information to reclaim watermark information;

a watermark information verification step of verifying consistency of the watermark information; and

a tampered position detection step of detecting, when the watermark information meets the consistency, a tampered position by comparing the image based on the second region and the error-corrected image based on the second region.

17. (Original) A program for making a computer function as an image processing apparatus of claim 1.

18. (Original) A program for making a computer implement an image processing method of claim 13.

19. (Original) A computer readable storage medium storing a program of claim 17.

20. (Withdrawn) A computer readable storage medium storing a program of claim
18.